MSI
MICRO-STAR INTERNATIONAL

Fuzzy RS690T/ RS690E

MS-9804 (V1.X) Mainboard

G52-98041X2

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Revision History

Revision	Revision History	Date
V1.1	Update for PCB1.X with RS690T & RS690E	June 2008

Technical Support

If a problem arises with your system and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please try the following help resources for further guidance.

- Visit the MSI website at ***http://global.msi.com.tw/index.php?func=service*** for FAQ, technical guide, BIOS updates, driver updates, and other information.
- Contact our technical staff at ***http://ocss.msi.com.tw***

Safety Instructions

1. Always read the safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Keep this equipment away from humidity.
4. Lay this equipment on a reliable flat surface before setting it up.
5. The openings on the enclosure are for air convection hence protects the equipment from overheating. DO NOT COVER THE OPENINGS.
6. Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
7. Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
8. Always Unplug the Power Cord before inserting any add-on card or module.
9. All cautions and warnings on the equipment should be noted.
10. Never pour any liquid into the opening that could damage or cause electrical shock.
11. If any of the following situations arises, get the equipment checked by service personnel:
    - † The power cord or plug is damaged.
    - † Liquid has penetrated into the equipment.
    - † The equipment has been exposed to moisture.
    - † The equipment does not work well or you can not get it work according to User's Manual.
    - † The equipment has dropped and damaged.
    - † The equipment has obvious sign of breakage.
12. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 60°C (140°F), IT MAY DAMAGE THE EQUIPMENT.

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

警告使用者:
這是甲類的資訊產品，在居住的環境中使用時，可能會造成無線電干擾，在這種情況下，使用者會被要求採取某些適當的對策。

廢電池請回收

For better environmental protection, waste batteries should be collected separately for recycling or special disposal.

FCC-B Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the measures listed below.

CE N1996

- † Reorient or relocate the receiving antenna.
- † Increase the separation between the equipment and receiver.
- † Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- † Consult the dealer or an experienced radio/television technician for help.

Notice 1
The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2
Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.

FC **Micro-Star International**
MS-9804

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

WEEE (Waste Electrical and Electronic Equipment) Statement

ENGLISH

To protect the global environment and as an environmentalist, MSI must remind you that...

Under the European Union ("EU") Directive on Waste Electrical and Electronic Equipment, Directive 2002/96/EC, which takes effect on August 13, 2005, products of "electrical and electronic equipment" cannot be discarded as municipal waste anymore and manufacturers of covered electronic equipment will be obligated to take back such products at the end of their useful life. MSI will comply with the product take back requirements at the end of life of MSI-branded products that are sold into the EU. You can return these products to local collection points.

DEUTSCH

Hinweis von MSI zur Erhaltung und Schutz unserer Umwelt

Gemäß der Richtlinie 2002/96/EG über Elektro- und Elektronik-Altgeräte dürfen Elektro- und Elektronik-Altgeräte nicht mehr als kommunale Abfälle entsorgt werden. MSI hat europaweit verschiedene Sammel- und Recyclingunternehmen beauftragt, die in die Europäische Union in Verkehr gebrachten Produkte, am Ende seines Lebenszyklus zurückzunehmen. Bitte entsorgen Sie dieses Produkt zum gegebenen Zeitpunkt ausschliessdich an einer lokalen Altgerätesammelstelle in Ihrer Nähe.

FRANÇAIS

En tant qu'écologiste et afin de protéger l'environnement, MSI tient à rappeler ceci...

Au sujet de la directive européenne (EU) relative aux déchets des équipement électriques et électroniques, directive 2002/96/EC, prenant effet le 13 août 2005, que les produits électriques et électroniques ne peuvent être déposés dans les décharges ou tout simplement mis à la poubelle. Les fabricants de ces équipements seront obligés de récupérer certains produits en fin de vie. MSI prendra en compte cette exigence relative au retour des produits en fin de vie au sein de la communauté européenne. Par conséquent vous pouvez retourner localement ces matériels dans les points de collecte.

РУССКИЙ

Компания MSI предпринимает активные действия по защите окружающей среды, поэтому напоминаем вам, что....

В соответствии с директивой Европейского Союза (ЕС) по предотвращению загрязнения окружающей среды использованным электрическим и электронным оборудованием (директива WEEE 2002/96/EC), вступающей в силу 13 августа 2005 года, изделия, относящиеся к электрическому и электронному оборудованию, не могут рассматриваться как бытовой мусор, поэтому производители вышеперечисленного электронного оборудования обязаны принимать его для переработки по окончании срока службы. MSI обязуется соблюдать требования по приему продукции, проданной под маркой MSI на территории ЕС, в переработку по окончании срока службы. Вы можете вернуть эти изделия в специализированные пункты приема.

ESPAÑOL

MSI como empresa comprometida con la protección del medio ambiente, recomienda:
Bajo la directiva 2002/96/EC de la Unión Europea en materia de desechos y/o equipos electrónicos, con fecha de rigor desde el 13 de agosto de 2005, los productos clasificados como "eléctricos y equipos electrónicos" no pueden ser depositados en los contenedores habituales de su municipio, los fabricantes de equipos electrónicos, están obligados a hacerse cargo de dichos productos al termino de su periodo de vida. MSI estará comprometido con los términos de recogida de sus productos vendidos en la Unión Europea al final de su periodo de vida. Usted debe depositar estos productos en el punto limpio establecido por el ayuntamiento de su localidad o entregar a una empresa autorizada para la recogida de estos residuos.

NEDERLANDS

Om het milieu te beschermen, wil MSI u graan herinneren dat….
De richtlijn van de Europese Unie (EU) met betrekking tot Vervuiling van Electrische en Electronische producten (2002/96/EC), die op 13 Augustus 2005 in zal gaan kunnen niet meer beschouwd worden als vervuiling.
Fabrikanten van dit soort producten worden verplicht om producten retour te nemen aan het eind van hun levenscyclus. MSI zal overeenkomstig de richtlijn handelen voor de producten die de merknaam MSI dragen en verkocht zijn in de EU. Deze goederen kunnen geretourneerd worden op lokale inzamelingspunten.

SRPSKI

Da bi zaštitili prirodnu sredinu, i kao preduzeće koje vodi računa o okolini i prirodnoj sredini, MSI mora da vas podseti da…
Po Direktivi Evropske unije ("EU") o odbačenoj elektronskoj i električnoj opremi, Direktiva 2002/96/EC, koja stupa na snagu od 13. Avgusta 2005, proizvodi koji spadaju pod "elektronsku i električnu opremu" ne mogu više biti odbačeni kao običan otpad i proizvođači ove opreme biće prinuđeni da uzmu natrag ove proizvode na kraju njihovog unbićajnog veka trajanja. MSI će poštovati zahtev o preuzimanju ovakvih proizvoda kojima je istekao vek trajanja, koji imaju MSI oznaku i koji su prodati u EU. Ove proizvode možete vratiti na lokalnim mestima za prikupljanje.

POLSKI

Aby chronić nasze środowisko naturalne oraz jako firma dbająca o ekologię, MSI przypomina, że...
Zgodnie z Dyrektywą Unii Europejskiej ("UE") dotyczącą odpadów produktów elektrycznych i elektronicznych (Dyrektywa 2002/96/EC), która wchodzi w życie 13 sierpnia 2005, tzw. "produkty oraz wyposażenie elektryczne i elektroniczne " nie mogą być traktowane jako śmieci komunalne, tak więc producenci tych produktów będą zobowiązani do odbierania ich w momencie gdy produkt jest wycofywany z użycia. MSI wypełni wymagania UE, przyjmując produkty (sprzedawane na terenie Unii Europejskiej) wycofywane z użycia. Produkty MSI będzie można zwracać w wyznaczonych punktach zbiorczych.

TÜRKÇE

Çevreci özelliğiyle bilinen MSI dünyada çevreyi korumak için hatırlatır:

Avrupa Birliği (AB) Kararnamesi Elektrik ve Elektronik Malzeme Atığı, 2002/96/EC Kararnamesi altında 13 Ağustos 2005 tarihinden itibaren geçerli olmak üzere, elektrikli ve elektronik malzemeler diğer atıklar gibi çöpe atılamayacak ve bu elektonik cihazların üreticileri, cihazların kullanım süreleri bittikten sonra ürünleri geri toplamakla yükümlü olacaktır. Avrupa Birliği'ne satılan MSI markalı ürünlerin kullanım süreleri bittiğinde MSI ürünlerin geri alınması isteği ile işbirliği içerisinde olacaktır. Ürünlerinizi yerel toplama noktalarına bırakabilirsiniz.

ČESKY

Záleží nám na ochraně životního prostředí - společnost MSI upozorňuje...

Podle směrnice Evropské unie ("EU") o likvidaci elektrických a elektronických výrobků 2002/96/EC platné od 13. srpna 2005 je zakázáno likvidovat "elektrické a elektronické výrobky" v běžném komunálním odpadu a výrobci elektronických výrobků, na které se tato směrnice vztahuje, budou povinni odebírat takové výrobky zpět po skončení jejich životnosti. Společnost MSI splní požadavky na odebírání výrobků značky MSI, prodávaných v zemích EU, po skončení jejich životnosti. Tyto výrobky můžete odevzdat v místních sběrnách.

MAGYAR

Annak érdekében, hogy környezetünket megvédjük, illetve környezetvédőként fellépve az MSI emlékezteti Önt, hogy ...

Az Európai Unió („EU") 2005. augusztus 13-án hatályba lépő, az elektromos és elektronikus berendezések hulladékairól szóló 2002/96/EK irányelve szerint az elektromos és elektronikus berendezések többé nem kezelhetőek lakossági hulladékként, és az ilyen elektronikus berendezések gyártói kötelessé válnak az ilyen termékek visszavételére azok hasznos élettartama végén. Az MSI betartja a termékvisszavétellel kapcsolatos követelményeket az MSI márkanév alatti az EU-n belül értékesített termékek esetében, azok élettartamának végén. Az ilyen termékeket a legközelebbi gyűjtőhelyre viheti.

ITALIANO

Per proteggere l'ambiente, MSI, da sempre amica della natura, ti ricorda che....

In base alla Direttiva dell'Unione Europea (EU) sullo Smaltimento dei Materiali Elettrici ed Elettronici, Direttiva 2002/96/EC in vigore dal 13 Agosto 2005, prodotti appartenenti alla categoria dei Materiali Elettrici ed Elettronici non possono più essere eliminati come rifiuti municipali: i produttori di detti materiali saranno obbligati a ritirare ogni prodotto alla fine del suo ciclo di vita. MSI si adeguerà a tale Direttiva ritirando tutti i prodotti marchiati MSI che sono stati venduti all'interno dell'Unione Europea alla fine del loro ciclo di vita. È possibile portare i prodotti nel più vicino punto di raccolta.

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Chapter 1
Product Overview

Thank you for choosing the Fuzzy RS690T/ RS690E (MS-9804 v1.X) Mini ITX mainboard from MSI.

Based on the innovative **AMD® RS690T/ RS690E** & **SB600** controllers for optimal system efficiency, the Fuzzy RS690T/ RS690E accommodates the latest **AMD® Sempron ,Athlon 64/64 X2 (Dual Core)** processors in Socket AM2 and supports two 533/ 667/ 800 MHz DDR2 SO-DIMM slots to provide the maximum of 4GB memory capacity.

In the entry-level and mid-range market segment, the Fuzzy RS690T/ RS690E can provide a high-performance solution for today's front-end and general purpose workstation, as well as in the future.

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Mainboard Specifications

Processor Support

- AMD Sempron ,Athlon 64/64 X2 (Dual Core) processor with AM2 package
- 4-pin CPU fan pinheader with Smart Fan Speed Control

Supported FSB

- Hyper Transport supporting speed up to 1 GHz (2000MT/s)

Chipset

- Northbridge : AMD RS690T/ RS690E (RS690E does not support Macrovision & TV-out)
- Southbridge : AMD SB600

Memory Support

- DDR2 400/533/667/800 (4GB Max)
- 2 DDR2 SO-DIMM slots (unbuffered)

LAN

- 2 PCI-E Gb LAN by Marvell 88E8056

Audio

- Realtek ALC888 7.1-channel HDA codec
- 6 watt amplifier

IDE

- 1 40-pin IDE connector
- Supports 2 IDE devices

SATA

- 2 SATA II ports by SB600
- Supports storage and data transfers at up to 3 Gb/s

Expansion Slots

- 1 PCI slot
- 1 Mini PCI-E socket

Connectors

- **Rear I/O**
  - 1 PS/2 mouse port
  - 1 PS/2 keyboard port
  - 2 COM ports
  - 2 LAN jacks
  - 1 VGA/ HDMI stack connector
  - 4 USB ports
  - 5 flexible audio jacks
  - 1 optical SPDIF-out jack

- **Onboard Connector**
  - 2 USB connectors (4 ports)
  - 1 parallel port connector (LPT)
  - 1 LVDS connector
  - 1 TV-Out connector (for RS690T only)
  - 1 amplifier connector
  - 1 front panel connector
  - 1 SMBUS connector
  - 1 CPU fan connector
  - 1 system fan connector
  - 2 SATA connectors
  - 1 Chassis Intrusion connector

Form Factor

- Mini-ITX (17.0cm X17.0cm)

Mounting

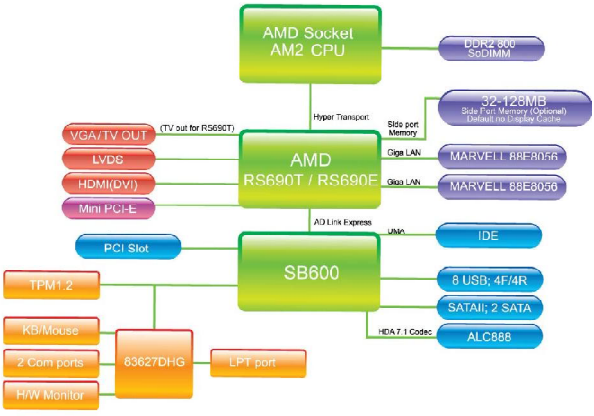
- 4 mounting holes

Environmental

- **Operating Temperature**
  - Temperature: -10°C ~ 70°C
  - Humidity: 0% ~ 85% RH

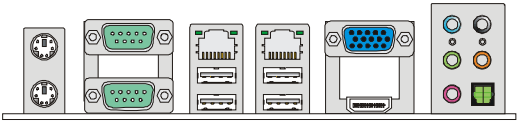
- **Storage Temperature**
  - Temperature: -20°C ~ 80°C
  - Humidity: 25% ~ 90% RH

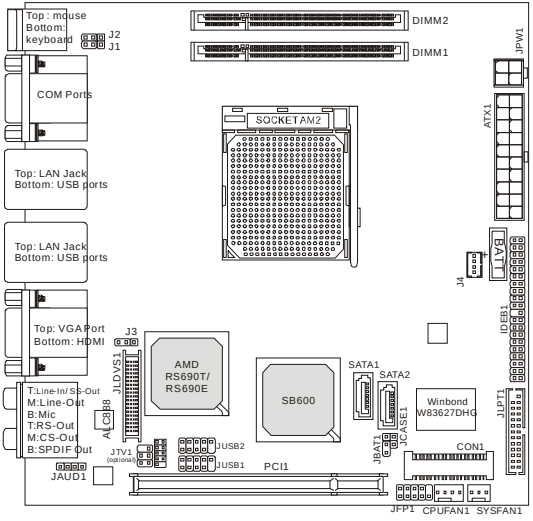
Block Diagram



Mainboard Layout

Backpanel I/O





Fuzzy RS690T/ RS690E (MS-9804 v1.X) Mini ITX Mainboard

Power Consumption

Component	Description
CPU	AMD Athlon™ 64 x2 Dual Core 2G
DDR2	1024MB DDR2 533 *2
HDD	Maxtor 80G
ODD	NEC DVD-Multi Record ND-4550A

MS-9804	12Vp	12V	5V	3.3V	5VSB	-12V	W
AMD ThermNow! Utility	4.2	0.81	3.03	1.08	0.032	0.028	79.33
Particle Fuly + VCD + Xcopy	3.07	1.01	4.66	1.07	0.039	0.02	76.226
3Dmark 2005	2.81	0.84	4.27	1.06	0.04	0.042	69.352
Idle	0.82	0.81	3.09	1.17	0.024	0.017	39.195
S3	0	0	0	0	0.512	0	2.56

Safety compliance & MTBF

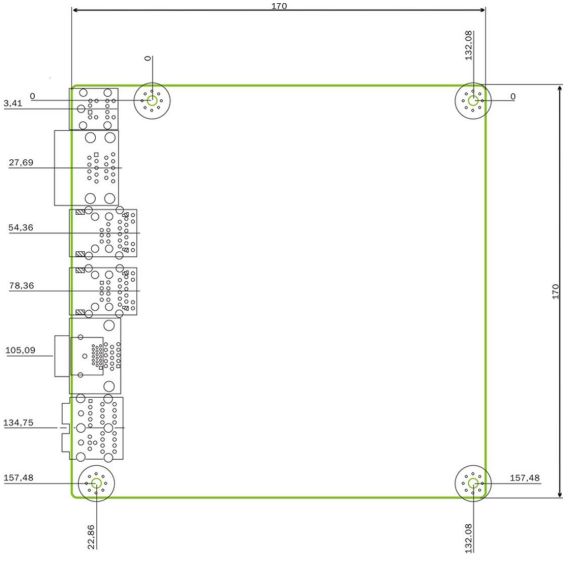
Safety compliance

Certification	Standard number		Title of standard
CE	RFI	EN 55022:1998+A1:2000+A2:2003 Class B	Product family standard
		EN 6100-3-2:2000 Class D	Limits for harmonic current emission
		EN 6100-3-3:1995+A1:2001	Limitation of voltage fluctuation and flicker in low-voltage supply system
	Immunity	EN 55024:1998+A1:2001+A2:2003	Product family standard
BSMI	CNS 13438 乙類(2006年版)		
C-Tick	AS/NZS CISPR 22:2004		
FCC	FCC CFR Title 47 Part 15 Subpart B: 2005 Class B		
	CISPR 22: 2005		
VCCI	VCCI V-3:2004, Class B		
	VCCI V-4:2004, Class B		

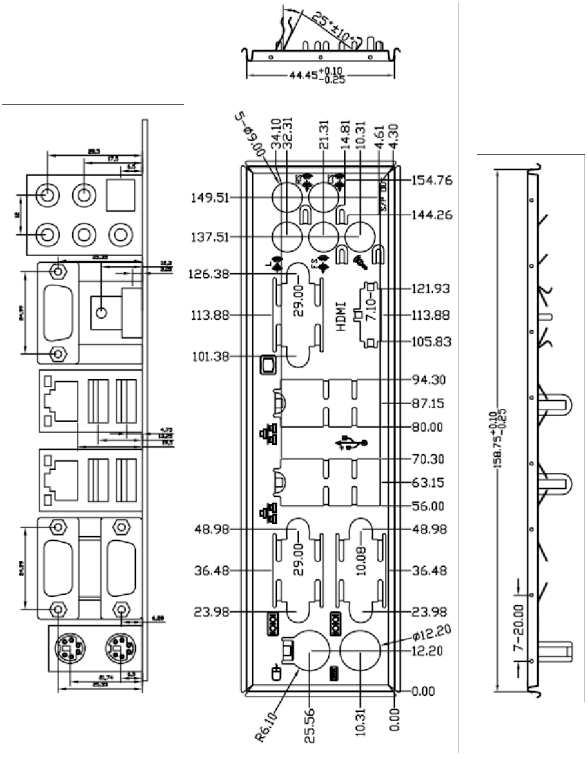
MTBF - Reliability Prediction

Calculation Model	Operation temperature(°C)	Operating Environment	Duty Cycle	MTBF(hr.)
Telcordia Issue 1	35	GF, GU - Ground Fixed, Uncontrolled	100%	93,411
Telcordia Issue 1	55	GF, GU - Ground Fixed, Uncontrolled	100%	52,174

Board Dimension



Back Panel & I/O Shield Drawing



Chapter 2
Hardware Setup

This chapter provides you with the information about hardware setup procedures. While doing the installation, be careful in holding the components and follow the installation procedures. For some components, if you install in the wrong orientation, the components will not work properly.

Use a grounded wrist strap before handling computer components. Static electricity may damage the components.

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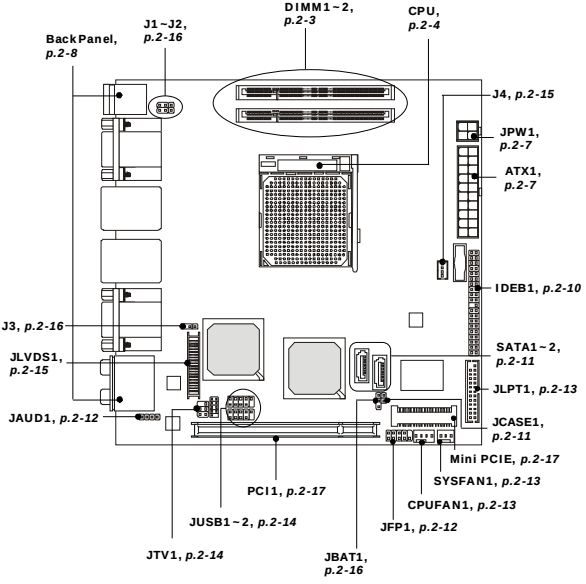
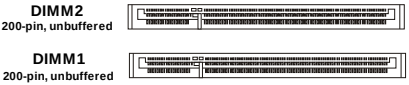
Quick Components Guide



Memory

The mainboard provides two 200-pin **unbuffered DDR2 400/533/667/800** SO-DIMM slots and supports up to 4GB system memory.



Installing Memory Modules

1. The memory module has only one notch on the center and will only fit in the right orientation.
2. Insert the memory module vertically into the SO-DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the SO-DIMM slot.

Important

You can barely see the golden finger if the memory module is properly inserted in the DIMM slot.

3. The clip at each side of the SO-DIMM slot will automatically close.

Important

1. Make sure that you install the memory modules first before installing the CPU and cooler set.
2. Always insert the memory module into the DIMM2 first.

CPU (Central Processing Unit)

The mainboard supports AMD® Athlon64/ 64x2 & Sempron processors. The mainboard uses a CPU socket called Socket AM2 for easy CPU installation. When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

Important

Overheating

Overheating will seriously damage the CPU and system. Always make sure the cooling fan can work properly to protect the CPU from overheating. Make sure that you apply an even layer of thermal paste (or thermal tape) between the CPU and the heatsink to enhance heat dissipation.

Replaceing the CPU

While replacing the CPU, always turn off the ATX power supply or unplug the power supply's power cord from the grounded outlet first to ensure the safety of CPU.

CPU Installation Procedures for Socket AM2

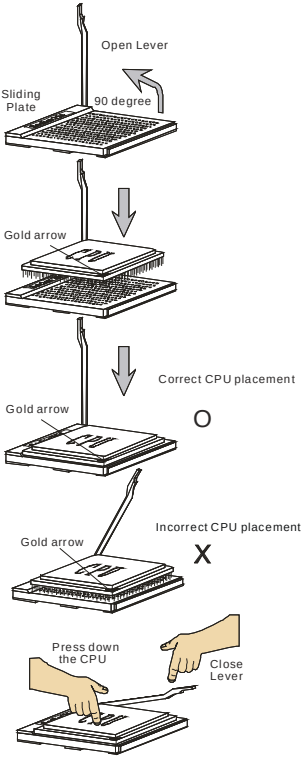
1. Please turn off the power and unplug the power cord before installing the CPU.

2. Pull the lever sideways away from the socket. Make sure to raise the lever up to a 90-degree angle.

3. Look for the gold arrow of the CPU. The gold arrow should point as shown in the picture. The CPU can only fit in the correct orientation.

4. If the CPU is correctly installed, the pins should be completely embedded into the socket and can not be seen. Please note that any violation of the correct installation procedures may cause permanent damages to your mainboard.

5. Press the CPU down firmly into the socket and close the lever. As the CPU is likely to move while the lever is being closed, always close the lever with your fingers pressing tightly on top of the CPU to make sure the CPU is properly and completely embedded into the socket.



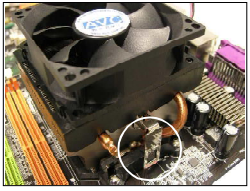
Installing AMD Socket AM2 CPU Cooler Set

When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

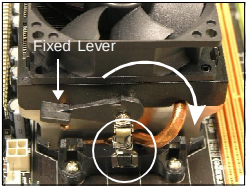
Important

Mainboard photos shown in this section are for demonstration of the cooler installation for Socket AM2 CPUs only. The appearance of your mainboard may vary depending on the model you purchase.

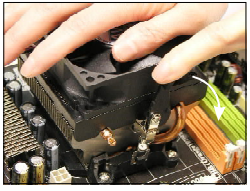
1. Position the cooling set onto the retention mechanism.
   Hook one end of the clip to hook first.



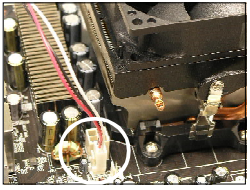
2. Then press down the other end of the clip to fasten the cooling set on the top of the retention mechanism. Locate the Fix Lever and lift up it .



3. Fasten down the lever.



4. Attach the CPU Fan cable to the CPU fan connector on the mainboard.

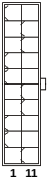


Power Supply

ATX 20-Pin System Power Connector: ATX1

This connector allows you to connect to an ATX power supply. To connect to the ATX power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.

ATX1



ATX1 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	GND	13	GND
4	5V	14	PS_ON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PW_OK	18	-5V
9	5V_SB	19	5V
10	12V	20	5V

ATX 12V Power Connector: JPW1

This 12V power connector JPW1 is used to provide power to the CPU.

JPW1

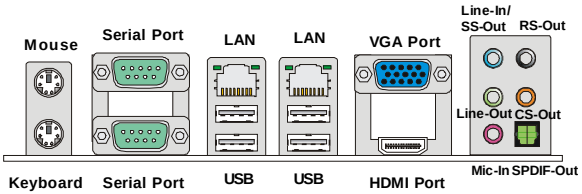
Pin Definition

PIN	SIGNAL
1	GND
2	GND
3	12V
4	12V

Important

*Power supply of **350watts** (and above) is highly recommended for system stability.*

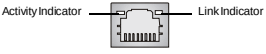
Back Panel



▶ Mouse/Keyboard Connector
The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

▶ Serial Port
The serial port is a 16550A high speed communications port that sends/ receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connector.

▶ LAN (RJ-45) Jacks
The standard RJ-45 jacks are for connection to Local Area Network (LAN). You can connect network cables to them.



		Left LED	Right LED
		Active LED	100M/1000M Speed LED
LED Color		Yellow	Green/Orange
10M Cable Plug-in	No Transmission	OFF	OFF
	Transition	Yellow(Blinking)	OFF
100M Cable Plug-in	No Transmission	OFF	Green(Lighting)
	Transition	Yellow(Blinking)	Green(Lighting)
1000M Cable Plug-in	No Transmission	OFF	Orange(Lighting)
	Transition	Yellow(Blinking)	Orange(Lighting)
In S3/S4/S5 Standby State		OFF	OFF

▶ USB Connectors
The UHCI (Universal Host Controller Interface) Universal Serial Bus root is for attaching USB devices such as keyboard, mouse, or other USB-compatible devices.

▶ VGA Port
The DB15-pin female connector is provided for video monitors.

▶ HDMI Port
The High-Definition Multimedia Interface (HDMI) is an all-digital audio/video interface capable of transmitting uncompressed streams. HDMI supports all TV format, including standard, enhanced, or high-definition video, plus multi-channel digital audio on a single cable.

▶ Audio Port Connectors
These audio connectors are used for audio devices. You can differentiate the color of the audio jacks for different audio sound effects.

- **Line-In/ SS-Out (Blue)** - Line In / Side-Surround Out in 7.1 channel mode, is used for external CD player, tapeplayer or other audio devices.
- **Line-Out (Green)** - Line Out, is a connector for speakers or headphones.
- **Mic (Pink)** - Mic, is a connector for microphones.
- **RS-Out (Black)** - Rear-Surround Out in 4/ 5.1/ 7.1 channel mode.
- **CS-Out (Orange)** - Center/ Subwoofer Out in 5.1/ 7.1 channel mode.

▶ Optical S/PDIF-Out connector
This SPDIF (Sony & Philips Digital Interconnect Format) connector is provided for digital audio transmission to external speakers through a fiber cable.

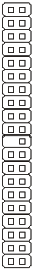
Connectors

IDE Connector: IDEB1

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 33/66/100/133 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 33/66/100/133 function. You can connect hard disk drives, CD-ROM and other IDE devices.

The Ultra ATA133 interface boosts data transfer rates between the computer and the hard drive up to 133 megabytes (MB) per second.

IDEB1

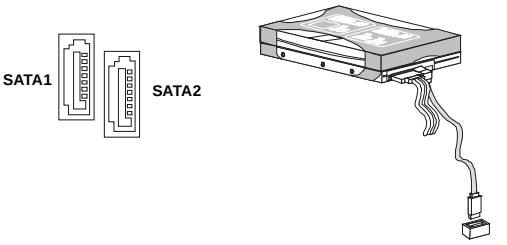


Important

If you install two IDE devices, you must configure the second drive to Slave mode by setting its jumper. Refer to the hard disk documentation supplied by hard disk vendors for jumper setting instructions.

Serial ATA Connectors: SATA1, SATA2

SATA1~SATA2 are high-speed SATA interface ports and support SATA data rates of 300MB/s. Each SATA connector can connect to 1 hard disk device and is fully compliant with Serial ATA 2.0 specifications.



Important

Please do not fold the Serial ATA cable into 90-degree angle. Otherwise, data loss may occur during transmission.

Chassis Intrusion Connector: JCASE1

This connector connects to the chassis intrusion switch cable. If the chassis is opened, the chassis intrusion mechanism will be activated. The system will record this status and show a warning message on the screen. To clear the warning, you must enter the BIOS utility and clear the record.

JCASE1

Audio Amplifier Connector: JAUD1

The 6W JAUD1 is used to connect audio amplifiers to enhance audio performance.

JAUD1

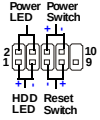
Pin Definition

PIN	SIGNAL
1	AMP_R+
2	AMP_R-
3	AMP_L+
4	AMP_L-

Front Panel Connector: JFP1

The mainboard provides one front panel connector for electrical connection to the front panel switches and LEDs. The JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.

JFP1



JFP1 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	HD_LED +	Hard disk LED pull-up
2	FPPWR/SLP	Power LED pull-up
3	HD_LED -	Hard disk active LED
4	FPPWR/SLP	Power LED pull-up
5	RST_SW-	Reset Switch low reference pull-down to GND
6	PWR_SW+	Power Switch high reference pull-up
7	RST_SW+	Reset Switch high reference pull-up
8	PWR_SW-	Power Switch low reference pull-down to GND
9	RSVD_DNU	Reserved. Do not use.

Fan Power Connectors: CPUFAN1, SYSFAN1

The fan power connectors support system cooling fan with +12V. When connecting the wire to the connectors, always take note that the red wire is the positive and should be connected to the +12V, the black wire is Ground and should be connected to GND. If the mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

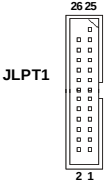
CPUFAN1 **SYSFAN1**

Important

Please refer to the recommended CPU fans at A D's official website or consult the vendors for proper CPU cooling fan.

Parallel Port Header: JLPT1

The mainboard provides a 26-pin header for connection to an optional parallel port bracket. The parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) mode.



JLPT1

Parallel Port Bracket (Optional)

PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
1	RSTB#	2	AFD#	15	PRND6	16	GND
3	PRND0	4	ERR#	17	PRND7	18	GND
5	PRND1	6	PINIT#	19	ACK#	20	GND
7	PRND2	8	LPT_SLIN#	21	BUSY	22	GND
9	PRND3	10	GND	23	PE	24	GND
11	PRND4	12	GND	25	SLCT	26	GND
13	PRND5	14	GND				

Front USB Connector: JUSB1/ JUSB2

The USB 2.0 pinheader is compliant with Intel® I/O Connectivity Design Guide. USB 2.0 technology increases data transfer rate up to a maximum throughput of 480Mbps, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as **USB HDD**, **digital cameras**, **MP3 players**, **printers**, **modems and the like**.

JUSB1/ 2

Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key (no pin)	10	NC

Important

Note that the pins of VCC and GND must be connected correctly to avoid possible damage.

TV-Out Connector: JTV1 (for RS690T only)

The mainboard provides a TV-Out connector.

Display Matrix

	CRT	HDMI	LVDS	TV OUT
CRT		X	V	X
HDMI	X		V	X
LVDS	V	V		V
TV OUT	X	X	V	

V : Support X : No Support

JTV1 Pin Definition

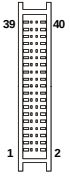
Pin	Description	Pin	Description
1	GND	2	Y_L
3	C_L	4	COMP_L
5	GND	6	Key (no pin)

LVDS Flat Panel Connector: JLVDS1

The LVDS (Low Voltage Differential Signal) connector provides a digital interface typically used with flat panels. After connecting an LVDS interfaced flat panel to the JLVDS1, be sure to check the panel datasheet and set the J1 LVDS Power Selection Jumper to a proper voltage.

Display Matrix				
	CRT	HDMI	LVDS	TV OUT
CRT		X	V	X
HDMI	X		V	X
LVDS	V	V		V
TV OUT	X	X	V	

V : Support X : No Support



JLVDS1

SIGNAL	PIN		SIGNAL
+12V	2	1	+12V
+12V	4	3	+12V
GND	6	5	+12V
GND	8	7	VCC3/VCC5
LCD_VDD	10	9	LCD_VDD
LDDC_DATA	12	11	LDDC_CLK
LVDS_VDDEN	14	13	L_BKLTCTL
GND	16	15	L_BKLTEN
LA_DATA0	18	17	LA_DATA0#
LA_DATA1	20	19	LA_DATA1#
LA_DATA2	22	21	LA_DATA2#
LA_CLK	24	23	LA_CLK#
LA_DATA3	26	25	LA_DATA3#
GND	28	27	GND
LB_DATA0	30	29	LB_DATA0#
LB_DATA1	32	31	LB_DATA1#
LB_DATA2	34	33	LB_DATA2#
LB_CLK	36	35	LB_CLK#
LB_DATA3	38	37	LB_DATA3#
GND	40	39	GND

I2C Bus Connector: J4

The mainboard provides one I2C (also known as I²C) Bus connector for users to connect System Management Bus (SMBus) interface.

J4

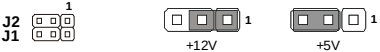
Pin Definition

Pin	Signal
1	VCC5F
2	SMBCLK
3	GND
4	SMBDATA

Jumpers

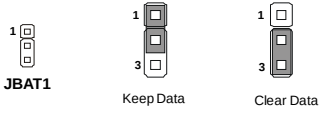
COM Port Power Jumpers: J1, J2

These jumpers specify the operation voltage of the onboard serial ports.



Clear CMOS Jumper: JBAT1

There is a CMOS RAM onboard that has a power supply from external battery to keep the data of system configuration. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, set this jumper to clear data.

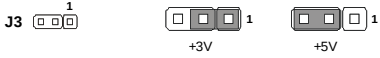


Important

You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

LVDS Power Selection Jumper: J3

Use this jumper to specify the operation voltage of the LVDS interfaced flat panel.



Slots

Mini PCI (Peripheral Component Interconnect) Express Slot

The CON1 is Mini PCI-E connector for wireless LAN, TV tuner, and Robson NAND Flash.

Mini PCI-E Slot

PCI (Peripheral Component Interconnect) Slot

The PCI slot supports LAN card, SCSI card, USB card, and other add-on cards that comply with PCI specifications.

32-bit PCI Slot

PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The PCI IRQ pins are typically connected to the PCI bus pins as follows:

DEVICE	IDSEL	INT A	INTB	INTC	INTD	REQ# / GNT#
32-bit PCI Slot	AD18	E	F	G	H	REQ#0 / GNT#0

Important

When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

Chapter 3
BIOS Setup

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use.
You may need to run the Setup program when:

- An error message appears on the screen during the system booting up, and requests you to run SETUP.
- You want to change the default settings for customized features.

MSI
MICRO-STAR INTERNATIONAL

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <Del> key to enter Setup.

Press Del to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Important

1. *The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.*
2. *Upon boot-up, the 1st line appearing after the memory count is the BIOS version. It is usually in the format:*

A9804KMS V1.0 071807 where:

1st digit refers to BIOS maker as A = AMI, W = AWARD, and P = PHOENIX.
2nd - 5th digit refers to the model number.
6th digit refers to the chipset as I = Intel, N = nVidia, A = ATi , K=AMD and V = VIA.
7th - 8th digit refers to the customer as MS = all standard customers.
V1.0 refers to the BIOS version.
071807 refers to the date this BIOS was released.

Control Keys

<↑>	Move to the previous item
<↓>	Move to the next item
<←>	Move to the item in the left hand
<→>	Move to the item in the right hand
<Enter>	Select the item
<Esc>	Jumps to the Exit menu or returns to the main menu from a submenu
<+/PU>	Increase the numeric value or make changes
<-/PD>	Decrease the numeric value or make changes
<F6>	Load Optimized Defaults
<F7>	Load Fail-Safe Defaults
<F10>	Save all the CMOS changes and exit

Getting Help

After entering the Setup menu, the first menu you will see is the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

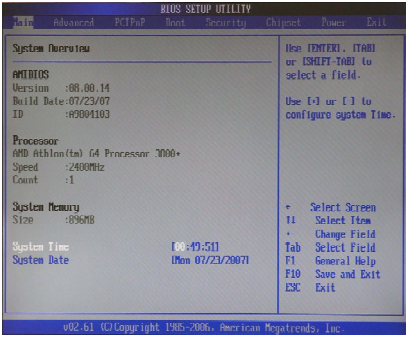
Sub-Menu

If you find a right pointer symbol (as shown in the right view) appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (↑↓) to highlight the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the <Esc >.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

The Menu Bar



▶ Main
Use this menu for basic system configurations, such as time, date etc.

▶ Advanced
Use this menu to set up the items of special enhanced features.

▶ PCIPnP
This entry appears if your system supports PnP/PCI.

▶ Boot
Use this menu to specify the priority of boot devices.

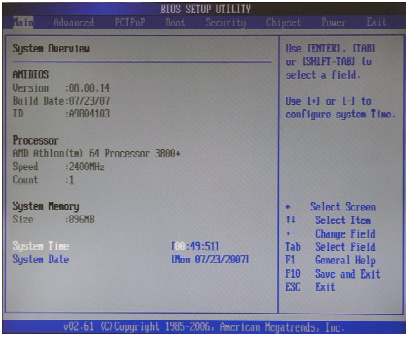
▶ Security
Use this menu to set supervisor and user passwords.

▶ Chipset
This menu controls the advanced features of the onboard Northbridge and Southbridge.

▶ Power
Use this menu to specify your settings for power management.

▶ Exit
This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.

Main

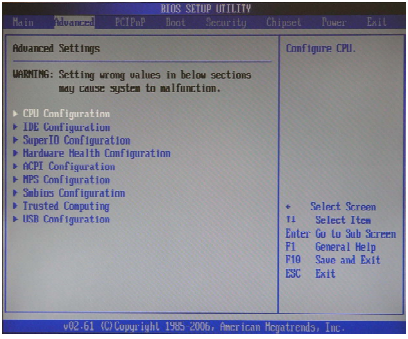


► AMI BIOS, Processor, System Memory
These items show the firmware and hardware specifications of your system. Read only.

► System Time
The time format is <Hour> <Minute> <Second>.

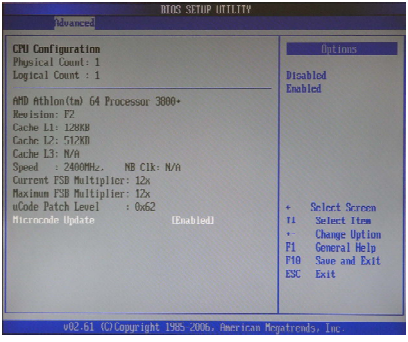
► System Date
The date format is <Day>, <Month> <Date> <Year>.

Advanced

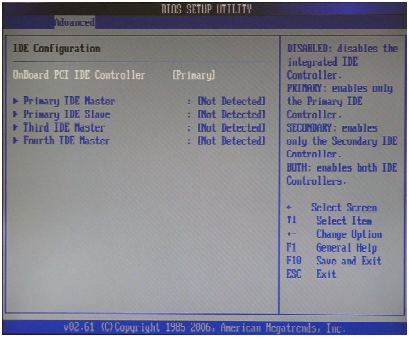


▶ CPU Configuration

These items show the advanced specifications of your CPU. Read only.



►IDE Configuration


BIOS SETUP UTILITY
Advanced
IDE Configuration
OnBoard PCI IDE Controller [Primary]
▶ Primary IDE Master : [Not Detected]
▶ Primary IDE Slave : [Not Detected]
▶ Third IDE Master : [Not Detected]
▶ Fourth IDE Master : [Not Detected]
DISABLED: disables the integrated IDE Controller.
PRIMARY: enables only the Primary IDE Controller.
SECONDARY: enables only the Secondary IDE Controller.
BOTH: enables both IDE Controllers.
↑ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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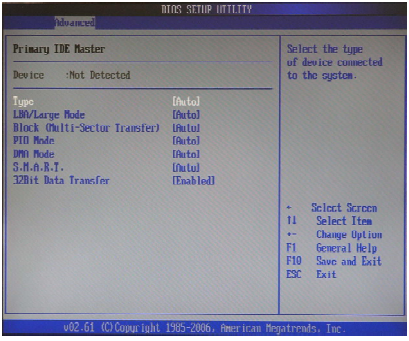
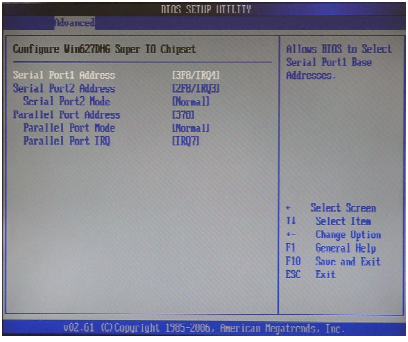
►OnBoard PCI IDE Controller
This setting is used to enable/ disable the IDE controller.

► Primary/Secondary/Third/Fourth IDE Master/Slave



[Type]	Press PgUp/<+> or PgDn/<-> to select [Manual], [None] or [Auto] type. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use [Manual] to define your own drive type manually.
[LBA/Large Mode]	Enabling LBA causes Logical Block Addressing to be used in place of Cylinders, Heads and Sectors
[Block(Multi-Sector Transfer)]	Any selection except Disabled determines the number of sectors transferred per block
[PIO Mode]	Indicates the type of PIO (Programmed Input/Output)
[DMA Mode]	Indicates the type of Ultra DMA
[S.M.A.R.T.]	This allows you to activate the S.M.A.R.T. (Self-Monitoring Analysis & Reporting Technology) capability for the hard disks. S.M.A.R.T is a utility that monitors your disk status to predict hard disk failure. This gives you an opportunity to move data from a hard disk that is going to fail to a safe place before the hard disk becomes offline.
[32 Bit Data Transfer]	Enables 32-bit communication between CPU and IDE card

▶ Super IO Configuration



▶ Serial Port 1 / 2 Address
Select an address and a corresponding interrupt for the serial port 1/2.

▶ Serial Port2 Mode Select
This setting allows you to specify the operation mode for serial port 2.
[Normal] RS-232C Serial Port
[IrDA] IrDA-compliant Serial Infrared Port
[ASKIR] Amplitude Shift Keyed Infrared Port

▶ Parallel Port Address
This setting specifies the I/O port address and IRQ of the onboard parallel port.

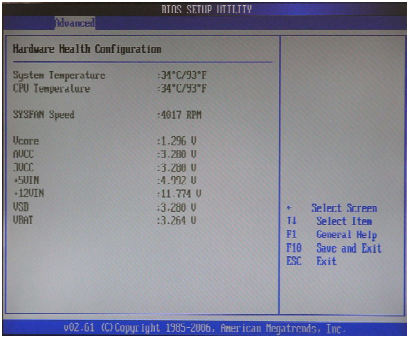
▶ Parallel Port Mode

[Normal]	Standard Parallel Port
[EPP]	Enhanced Parallel Port
[ECP]	Extended Capability Port
[ECP+EPP]	Extended Capability Port + Enhanced Parallel

To operate the onboard parallel port as Standard Parallel Port only, [Normal]. To operate the onboard parallel port in the EPP mode simultaneously, choose [EPP]. By choosing [ECP], the onboard parallel port will ECP mode only. Choosing [ECP + EPP] will allow the onboard parallel support both the ECP and EPP modes simultaneously.

▶ Parallel Port IRQ
This item allows you to set parallel port IRQ.

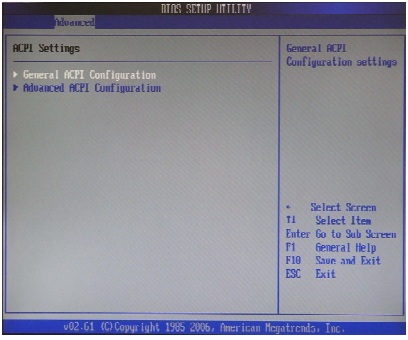
▶ Hardware Health Configuration



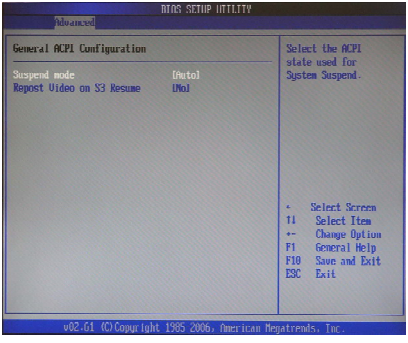
▶ System Temperature, CPU Temperature, SYSFAN Speed, Vcore, AVCC, 3VCC, +5VIN, +12VIN, VSB, VBAT

These items display the current status of all of the monitored hardware devices/components such as CPU voltage, temperatures and all fans' speeds.

▶ ACPI Settings



▶ General ACPI Configuration



▶ Suspend Mode

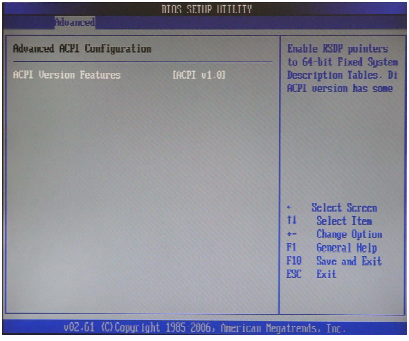
This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, you can choose to enter the Standby mode in S1 (POS) or S3 (STR) fashion through the setting of this field. Options are:

[S1 (POS)]	The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.
[S3 (STR)]	The S3 sleep mode is a lower power state where the information of system configuration and open applications/files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.
[Auto]	Auto arrange.

▶ Repost Video on S3 Resume

Selecting [Yes] allows BIOS to call VGABIOS to initialize the VGA card when system wakes up (resumes) from S3 sleep state. The system resume time is shortened when you disable the function, but system will need an video driver to initialize the graphics card. Therefore, if the video driver of the card does not support the initialization feature, the display may work abnormally or not function after resuming from S3.

▶ Advanced ACPI Configuration


BIOS SETUP UTILITY
Advanced
Advanced ACPI Configuration
ACPI Version Features [ACPI v1.0]
Enable RSDP pointers to 64-bit Fixed System Description Tables. Di ACPI version has some
↑ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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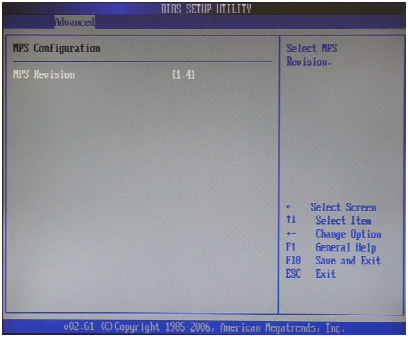
▶ ACPI Version Features

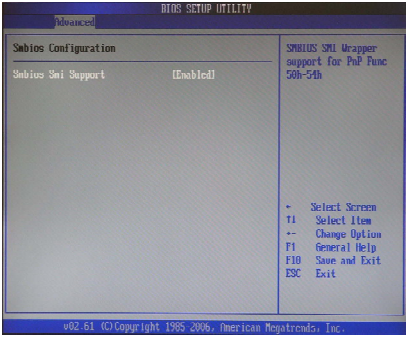
This setting allows you to select the ACPI version.

▶ **MPS Configuration**



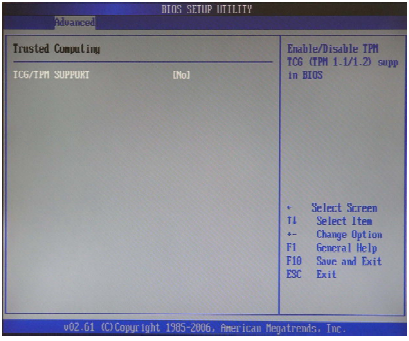
▶ **MPS Revision**
This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, consult the vendor of your operating system.

▶ **Smbios Configuration**



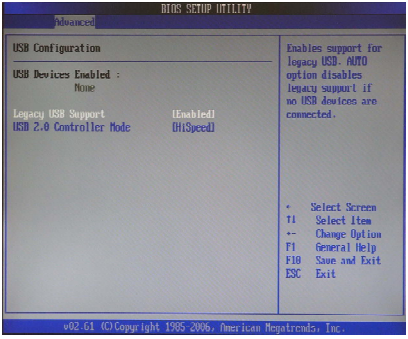
▶ Smbios Smi Support
SMBIOS SMI wrapper supports the PnP function :50h-54h.

▶ Trusted Computing



▶TCG/TPM SUPPORT
This setting controls the Trusted Platform Module (TPM) designed by the Trusted Computing Group (TCG). TPMs are special-purpose integrated circuits (ICs) built into a variety of platforms to enable strong user authentication and machine attestation—essential to prevent inappropriate access to confidential and sensitive information and to protect against *compromised networks.*

▶USB Configuration


BIOS SETUP UTILITY
Advanced
USB Configuration
USB Devices Enabled :
None
Legacy USB Support [Enabled]
USB 2.0 Controller Mode [HiSpeed]
Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected.
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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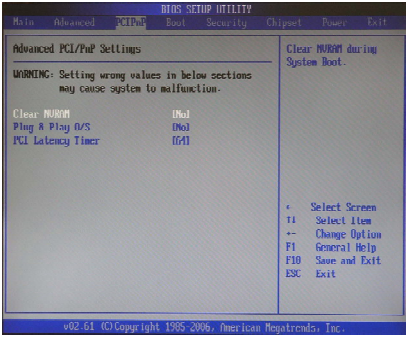
▶USB Legacy Support
Set to [Enabled] if your need to use any USB device in the operating system that does not support or have any USB driver installed, such as DOS and SCO Unix. Set to [Disabled] only if you want to use any USB device other than the USB mouse.

▶USB 2.0 controller mode
Use this field to select the USB 2.0 mode.

PCIPnP

This section describes configuring the PCI bus system and PnP (Plug & Play) feature. PCI, or **P**eripheral **C**omponent **I**nterconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Power Exit
Advanced PCI/PnP Settings
WARNING: Setting wrong values in below sections may cause system to malfunction.
Clear NVRAM [No]
Plug & Play O/S [No]
PCI Latency Timer [64]
Clear NVRAM during System Boot.
↑↓ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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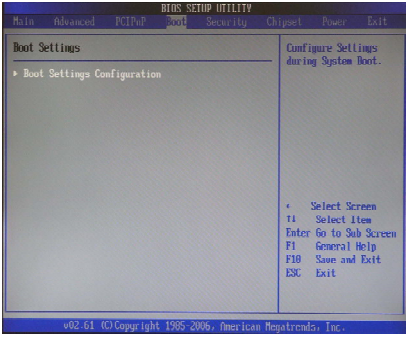
▶ Clear NVRAM
The ESCD (Extended System Configuration Data) NVRAM (Non-volatile Random Access Memory) is where the BIOS stores resource information for both PNP and non-PNP devices in a bit string format. When the item is set to *Yes*, the system will reset ESCD NVRAM right after the system is booted up and then set the setting of the item back to *No* automatically.

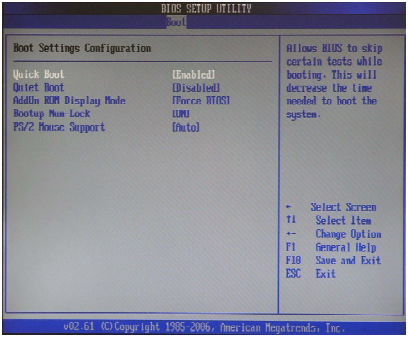
▶ Plug and Play O/S
When set to [Yes], BIOS will only initialize the PnP cards used for booting (VGA, IDE, SCSI). The rest of the cards will be initialized by the PnP operating system like Windows 98, 2000 or ME. When set to [No], BIOS will initialize all the PnP cards. Select Yes if the operating system is Plug & Play.

▶ PCI Latency Timer
This item controls how long each PCI device can hold the bus before another takes over. When set to higher values, every PCI device can conduct transactions for a longer time and thus improve the effective PCI bandwidth. For better PCI performance, you should set the item to higher values.

Boot



▶ Boot Settings Configuration


BIOS SETUP UTILITY
Boot
Boot Settings Configuration
Quick Boot [Enabled]
Quiet Boot [Disabled]
Addin ROM Display Mode [Force BIOS]
Bootup Num Lock [On]
PS/2 Mouse Support [Auto]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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▶ Quick Boot
Enabling this setting will cause the BIOS power-on self test routine to skip some of its tests during bootup for faster system boot.

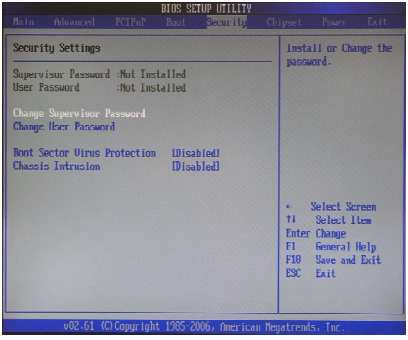
▶ Quiet Boot
This BIOS feature determines if the BIOS should hide the normal POST messages with the motherboard or system manufacturer's full-screen logo.
When it is enabled, the BIOS will display the full-screen logo during the boot-up sequence, hiding normal POST messages.
When it is disabled, the BIOS will display the normal POST messages, instead of the full-screen logo.
Please note that enabling this BIOS feature often adds 2-3 seconds of delay to the booting sequence. This delay ensures that the logo is displayed for a sufficient amount of time. Therefore, it is recommended that you disable this BIOS feature for a faster boot-up time.

▶ AddOn ROM Display Mode
This item is used to determine the display mode when an optional ROM is initialized during POST. When set to [Force BIOS], the display mode used by AMI BIOS is used. Select [Keep Current] if you want to use the display mode of optional ROM.

▶ Bootup Num-Lock
This setting is to set the Num Lock status when the system is powered on. Setting to [On] will turn on the Num Lock key when the system is powered on. Setting to [Off] will allow users to use the arrow keys on the numeric keypad.

▶ PS/2 Mouse Support
Select [Enabled] if you need to use a PS/2-interfaced mouse in the operating system.

Security



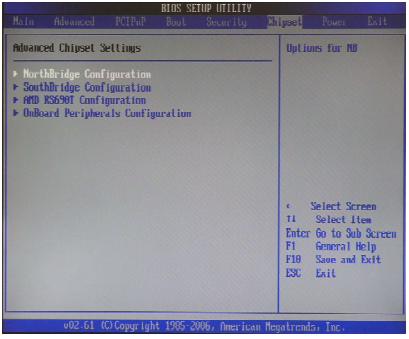
▶ Supervisor Password / Change Supervisor Password
Supervisor Password controls access to the BIOS Setup utility. These settings allow you to set or change the supervisor password.

▶ User Password / Change User Password
User Password controls access to the system at boot. These settings allow you to set or change the user password.

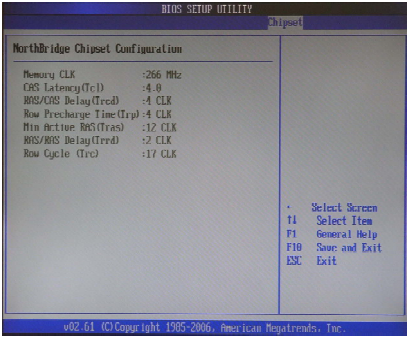
▶ Boot Sector Virus Protection
This function protects the BIOS from accidental corruption by unauthorized users or computer viruses. When enabled, the BIOS' data cannot be changed when attempting to update the BIOS with a Flash utility. To successfully update the BIOS, you'll need to disable this Flash BIOS Protection function.
You should enable this function at all times. The only time when you need to disable it is when you want to update the BIOS. After updating the BIOS, you should immediately re-enable it to protect it against viruses.

▶ Chassis Intrusion
The field enables or disables the feature of recording the chassis intrusion status and issuing a warning message if the chassis is once opened. To clear the warning message, set the field to [Reset]. The setting of the field will automatically return to [Enabled] later.

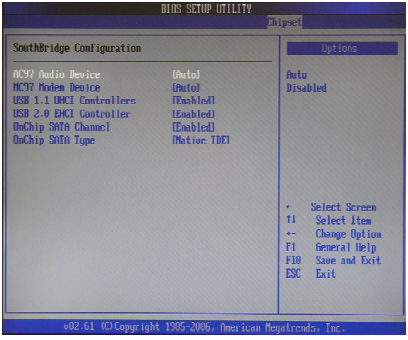
Chipset



► NorthBridge Configuration
These items show the DRAM timing. Read only.



▶ South Bridge Configuration



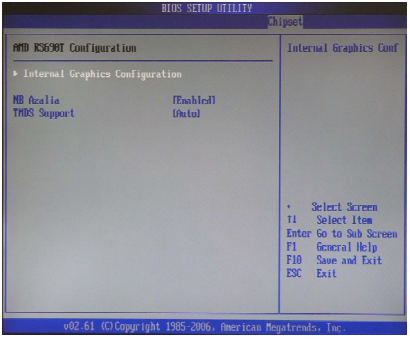
▶ AC97 Audio/ Modem Device
This setting is used to enable/disable the onboard AC97 audio/ modem device.

▶ USB 1.1 OCHI Controllers/ USB 2.0 EHCI Controller
This settings allow you to enable/disable the onboard USB1.1/ 2.0 controller.

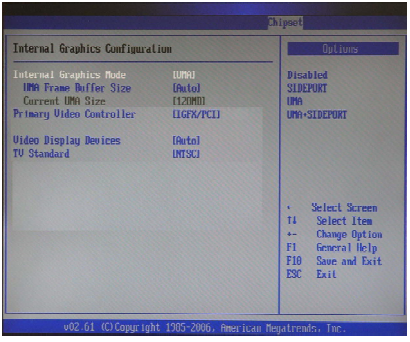
▶ OnChip SATA Channel
This item is used to enable/disable the onboard SATA channel.

▶ OnChip SATA Type
This item is used to specify the SATA type for SATA device.

▶ AMD 690T Configuration



▶ Internal Graphics Configuration



▶ Internal Graphics Mode Select
The field allows you to select whether the UMA (Unified Memory Architecture) or Sideport (Local Frame Buffer) memory allocated for video memory.

▶ UMA Frame Buffer Size
The field specifies the size of the system memory allocated for video memory.

▶ Current UMA Size
This item shows current UMA Size.

▶ Primary Video Controller
This item specifies which VGA card is your primary graphics adapter.

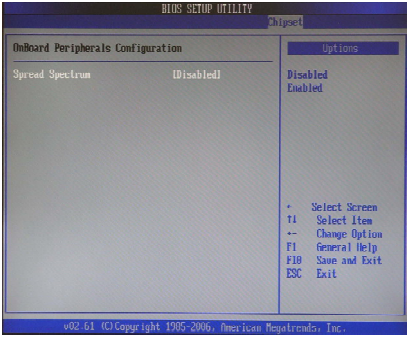
▶ Video Display Devices
Use the field to select the type of device you want to use as the display(s) of the system.

▶ TV Standard
Select the TV standard which is used as the video signal format of your TV if you have connected a TV to the system.

▶ NB Azalia
This setting controls the High Definition Audio interface integrated in the Northbridge.

▶ TMDS Support
This setting is used to enable/ disable TMDS (Transition Minimized Differential Signaling) technology.

▶ Onboard Peripherals Configuration



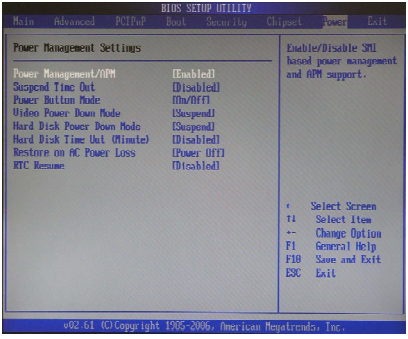
▶ Spread Spectrum

When the motherboard's clock generator pulses, the extreme values (spikes) of the pulses create EMI (Electromagnetic Interference). The Spread Spectrum function reduces the EMI generated by modulating the pulses so that the spikes of the pulses are reduced to flatter curves. If you do not have any EMI problem, leave the setting at Disabled for optimal system stability and performance. But if you are plagued by EMI, set to Enabled for EMI reduction. Remember to disable Spread Spectrum if you are overclocking because even a slight jitter can introduce a temporary boost in clock speed which may just cause your overclocked processor to lock up.

Important

1. *If you do not have any EMI problem, leave the setting at [Disabled] for optimal system stability and performance. But if you are plagued by EMI, select the value of Spread Spectrum for EMI reduction.*
2. *The greater the Spread Spectrum value is, the greater the EMI is reduced, and the system will become less stable. For the most suitable Spread Spectrum value, please consult your local EMI regulation.*
3. *Remember to disable Spread Spectrum if you are overclocking because even a slight jitter can introduce a temporary boost in clock speed which may just cause your overclocked processor to lock up.*

Power


BIOS SETUP UTILITY
Main Advanced PCI/PnP Boot Security Chipset Power Exit
Power Management Settings
Power Management/APM [Enabled]
Suspend Time Out [Disabled]
Power Button Mode [On/Off]
Video Power Down Mode [Suspend]
Hard Disk Power Down Mode [Suspend]
Hard Disk Time Out (Minute) [Disabled]
Restore on AC Power Loss [Power Off]
RTC Resume [Disabled]
Enable/Disable SMI based power management and APM support.
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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▶ Power Management/ APM
Setting to Enabled will activate an Adcanced Power Management (APM) device to enhance Max Saving mode and stop CPU internal clock.

▶ Suspend Time Out
If system activity is not detected for the length of time specified in this field, all devices except CPU will be shut off.

▶ Power Button Mode
This feature sets the function of the power button. Settings are:

[On/Off]	The power button functions as normal power off button.
[Suspend]	When you press the power button, the computer enters the suspend/sleep mode, but if the button is pressed for more than four seconds, the computer is turned off.

▶ Video Power Down Mode
This setting is used to control the mode in which the monitor will shut down. Settings are:

[Always On]	Monitor remains on during power-saving modes.
[Suspend -> Off]	Monitor blanked when system enters Suspend mode.
[Susp, Stby->Off]	Monitor blanked when system enters either Suspend or Standby mode.
[All Modes ->Off]	Monitor blanked when system enters any power saving mode.

▶ Hard Disk Power Down Mode
If HDD activity is not detected for the length of time specified in this field, the hard disk drive will be powered down while all other devices remain active.

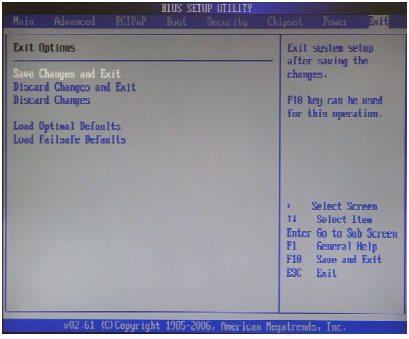
▶ Hard Disk Time Out (Minute)
After the selected period of system inactivity, the hard disk shut of.

▶ Restore on AC Power Loss
This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

[Power Off]	Leaves the computer in the power off state.
[Power On]	Leaves the computer in the power on state.
[Last State]	Restores the system to the previous status before power failure or interrupt occurred.

▶ RTC Resume
When [Enabled], your can set the date and time at which the RTC (real-time clock) alarm awakens the system from Suspend mode.

Exit


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Power Exit
Exit Options
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load Optimal Defaults
Load Failsafe Defaults
Exit system setup after saving the changes.
F10 key can be used for this operation.
↔ Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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▶ Save Changes and Exit
Save changes to CMOS and exit the Setup Utility.

▶ Discard Changes and Exit
Abandon all changes and exit the Setup Utility.

▶ Discard Changes
Abandon all changes and continue with the Setup Utility.

▶ Load Optimal Defaults
Use this menu to load the default values set by the mainboard manufacturer specifically for optimal performance of the mainboard.

▶ Load Failsafe Defaults
Use this menu to load the default values set by the BIOS vendor for stable system performance.

Chapter 4
System Resources

This chapter provides information on the following system resources:

1. Watch Dog Timer Setting (p.4-2);

2. AMI POST Code (p.4-3);

3. Resource List (p.4-6).

MSI
MICRO-STAR INTERNATIONAL

Watch Dog Timer Setting

Software code

```
SIO_IDX equ 4EH
SIO_DTA equ 4FH
Timer equ 10; reset after 10 seconds
```

1. Enter configuration mode
   ```
   mov dx,SIO_IDX
   mov al,87h
   out dx,al
   out dx,al
   ```

2. Set to LDN 08
   ```
   mov dx,SIO_IDX
   mov al,07h
   out dx,al
   mov dx,SIO_DTA
   mov al,08h
   out dx,al
   ```

3. Set WatchDog Timer
   ```
   mov dx,SIO_IDX
   mov al,0f6h
   out dx,al
   mov dx,SIO_DTA
   mov al,Timer
   out dx,al
   ```

4. Exit configuration mode
   ```
   mov dx,SIO_IDX
   mov al,0AAh
   out dx,al
   ```

AMI POST Code

Bootblock Initialization Code Checkpoinits

The Bootblock initialization code sets up the chipset, memory and other components before system memory is available. The following table describes the type of checkpoints that may occur during the bootblock initialization portion of the BIOS:

Checkpoint	Description
Before D1	Early chipset initialization is done. Early super I/O initialization is done including RTC and keyboard controller. NMI is disabled.
D1	Perform keyboard controller BAT test. Check if waking up from power management suspend state. Save power-on CPUID value in scratch CMOS.
DO	Go to flat mode with 4GB limit and GA20 enabled. Verify the bootblock checksum.
D2	Disable CACHE before memory detection. Execute full memory sizing module. Verify that flat mode is enabled.
D3	If memory sizing module not executed, start memory refresh and do memory sizing in Bootblock code. Do additional chipset initialization. Re-enable CACHE. Verify that flat mode is enabled.
D4	Test base 512KB memory. Adjust policies and cache first 8MB. Set stack.
D5	Bootblock code is copied from ROM to lower system memory and control is given to it. BIOS now executes out of RAM.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. Main BIOS checksum is tested. If BIOS recovery is necessary, control flows to checkpoint E0.
D7	Restore CPUID value back into register. The Bootblock- Runtime interface module is moved to system memory and control is given to it. Determine whether to execute serial flash
D8	The Runtime module is uncompressed into memory. CPUID information is stored in memory.
D9	Store the Uncompressed pointer for future use in PMM. Copying Main BIOS into memory. Leaves all RAM below 1MB Read-Write including E000 and F000 shadow areas but closing SMRAM.
DA	Restore CPUID value back into register. Give control to BIOS POST (ExecutePOSTKernel.) See *POST Code Checkpoint list* for more information.

Post Code Checkpoints

The POST code checkpoints are the largest set of checkpoints during the BIOS preboot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS:

Checkpoint	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable "Wcomsflags".
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system.
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock".
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
24	Uncompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initializes different devices through DIM.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying test information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.

Checkpoint	Description
38	Initializes different devices through DIM.
39	Initializes DMAC-1 & DMAC-2.
3A	Initializes RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU…etc.)successfully installed in the system and update the BDA, EBDA…etc.
50	Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7A	Initializes remaining option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested.
8C	Late POST initialization for chipset registers.
8E	Program the peripheral parameters. Enable / Disable NMI as selected.
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A8	Prepare CPU for OS boot including final MTRR values.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module.
AB	Prepare BBS for 19 boot.
AC	End of POST initialization of chipset registers.
B1	Save system contest for ACPI.
00	Passes control to OS Loader (typically INT19h).

Resource List

SB600 GPIO Config.

GPIO Pin	Type	Multiplexed	Power	Function
GPIO0	I/OD(3.3V)	NA	Main	NC
GPIO1	I/O(3.3V)	NA	Main	NC
GPIO2	I/O(3.3V)	NA	Main	NC
GPIO3	I/O(3.3V)	NA	Main	NC
GPIO4	I/O(3.3V)	NA	Main	NC
GPIO5	I/O(3.3V)	NA	Main	NC
GPIO6	I/OD(3.3V)	NA	Main	NC
GPIO7	I/O(3.3V)	NA	Main	NC
GPIO8	I/O(3.3V)	NA	Main	NC
GPIO9	I/O(3.3V)	NA	Main	IDE Cable Dectec
GPIO10	I/O(3.3V)	NA	Main	NC
GPIO11	I/O(S5_3.3V)	SPI_DO	Standby	SPI_DO
GPIO12	I/O(S5_3.3V)	SPI_DI	Standby	SPI_DI
GPIO13	O(3.3V)	NA	Main	NC
GPIO14	I/O(3.3V)	NA	Main	NC
GPIO[15.30]	I/O(3.3V)	IDE_D [0..15]	Main	IDE_D [0..15]
GPIO31	I/O(S5_3.3V)	SPI_HOLD#	Standby	SPI_HOLD#
GPIO32	I/O(S5_3.3V)	SPI_CS#	Standby	SPI_CS#
GPIO33	I/O(3.3V)	INTE#	Main	INTE#
GPIO34	I/O(3.3V)	INTE#	Main	INTE#
GPIO35	I/O(3.3V)	INTE#	Main	INTE#
GPIO36	I/O(3.3V)	INTE#	Main	INTE#
GPIO37	I/O(3.3V)	NA	Main	NC
GPIO38	I/O(3.3V)	NA	Main	NC
GPIO39	I/O(3.3V)	AC_SDOUT	Main	AC_SDOUT#
GPIO40	I/O(3.3V)	NA	Main	NC
GPIO41	I/O(3.3V)	NA	Main	NC
GPIO42	I/O(S5_3.3V)	ACZ_SDIN0	Standby	ACZ_SDIN0#
GPIO43	I/O(S5_3.3V)	NA	Standby	NC
GPIO44	I/O(S5_3.3V)	NA	Standby	NC
GPIO45	I/O(S5_3.3V)	NA	Standby	NC
GPIO46	I/O(S5_3.3V)	NA	Standby	GPIO46
GPIO47	I/O(S5_3.3V)	SPI_CLK	Standby	SPI_CLK
GPIO48	I/O(3.3V)	NA	Main	AMP_GAIN0
GPIO49	I/O(3.3V)	NA	Main	AMP_GAIN1
GPIO50	I/O(3.3V)	NA	Main	AMP_EN
GPIO51	I/O(3.3V)	NA	Main	NC
GPIO52	I/O(3.3V)	NA	Main	NC
GPIO[53.60]	I/O(3.3V)	NA	Main	NC
GPIO61	I/O(3.3V)	NA	Main	NC
GPIO62	I/O(3.3V)	NA	Main	NC
GPIO63	I/O(3.3V)	NA	Main	NC
GPIO64	I/O(3.3V)	TALERT#	Main	TALERT#
GPIO65	I/O(3.3V)	BMREQ#	Main	BMREQ#
GPIO66	I/O(S5_3.3V)	NA	Standby	NC
GPIO67	OD(3.3V)	SATA_ACT#	Main	SATA_ACT#
GPIO68	I/O(3.3V)	NA	Main	NC
GPIO69	I/O(S5_3.3V)	NA	VBAT	NC
GPIO70	I/O(3.3V)	NA	Main	NC
GPIO71	I/O(3.3V)	NA	Main	NC
GPIO72	I/O(3.3V)	NA	Main	NC
GPIO73	I/O(3.3V)	NA	Main	NC

SB600 GPM Config.

GPM_Pin	Type	Multiplexed	Power	Function
GPM#0	I/O(S5_3.3V)	USB_OC0#	Standby	USB OverCurrent
GPM#1	I/O(S5_3.3V)	USB_OC1#	Standby	USB OverCurrent
GPM#2	I/O(S5_3.3V)	NA	Standby	NC
GPM#3	I/O(S5_3.3V)	NA	Standby	NC
GPM#4	I/O(S5_3.3V)	NA	Standby	NC
GPM#5	I/O/OD(S5_3.3V)	NA	Standby	WLAN_PWRON
GPM#6	I/O(S5_3.3V)	NA	Standby	GPM6#
GPM#7	I/O(S5_3.3V)	SYS_RESET#	Standby	SYS_RESET#
GPM#8	I/O(S5_3.3V)	NA	Standby	NC
GPM#9	I/O(S5_3.3V)	NA	Standby	NC

SB600 EXTEVENT & GEVENT Config.

GEVENT_Pin	Type	Multiplexed	Power	Function
EXTEVENT0#	I/O(S5_3.3V)	NA	Standby	NC
EXTEVENT1#	I/O(3.3V)	NA	Main	NC
GEVENT2#	I/O(S5_3.3V)	NA	Standby	NC
GEVENT3#	I/O(S5_3.3V)	LPC_PME#	Standby	LPC_PME#
GEVENT4#	I/O(S5_3.3V)	PCI_PME#	Standby	PCI_PME#
GEVENT5#	I/O(S5_3.3V)	NA	Standby	NC
GEVENT6#	I/O(S5_3.3V)	NA	Standby	NC
GEVENT7#	I/O(S5_3.3V)	NA	Standby	NC
GEVENT8#	I/O(S5_3.3V)	PCIE_WAKE#	Standby	PCIE_WAKE#

I/O Map

I/O Port	Description
0000-000F	DMA Controller 1
0020-0021	Interrupt Controller 1
002E-002F	SIO Port
0040-0043	System Timer
004E-004F	TPM Port
0060, 0064	Keyboard Controller
0070-0073	RTC and CMOS
0080-0090	DMA Controller Page Registers
0092	Port 92h
00A0-00A1	Interrupt Controller 2
00B2-00B3	APM register
00C0-00DF	DMA Controller 2
00F0-00FF	Numeric Data Processor
01F0-01F7	Primary IDE Controller
02F8-02FF	COM2
0376	Secondary IDE Controller
0378-037F	LPT1
03F6	Primary IDE Controller
03F8-03FF	COM1
0800-085F	ACPI I/O space
0B00-0B0F	SMBus I/O Space
0CF8-0CFF	PCI configuration Port

PCI Devices

PCI Device					
Device	**Ven. ID**	**Dev. ID**	**Bus#**	**Dev#**	**Func#**
ATi Host Bridge	1002	7910	00	00	00
ATi PCI-to-PCI Bridge	1002	7912	00	01	00
ATi PCI-to-PCI Bridge	1002	7914	00	04	00
ATi PCI-to-PCI Bridge	1002	7915	00	05	00
ATi PCI-to-PCI Bridge	1002	7916	00	06	00
ATi IDE Controller	1002	4380	00	12	00
ATi OHCI USB Controller	1002	4387	00	13	00
ATi OHCI USB Controller	1002	4388	00	13	01
ATi OHCI USB Controller	1002	4389	00	13	02
ATi OHCI USB Controller	1002	438A	00	13	03
ATi OHCI USB Controller	1002	438B	00	13	04
ATi Unknown Deivce	1002	4386	00	13	05
ATi SMBus	1002	4385	00	14	00
ATi IDE Controller	1002	438C	00	14	01
ATi Unknown Deivce	1002	4383	00	14	02
ATi ISA Bridge	1002	438D	00	14	03
ATi Subtractive Decode P2P Bridge	1002	4384	00	14	04
AMD Host Bridge	1022	1100	00	18	00

SMBus Resource Allocation

SMBus Resource Allocation		
Device	Address	Description
MS-6	0101 111X	MSI ACPI Controller
DIMM Slot	1010 0000	SPD

ISA Interrupt Allocation

ISA Interrupt Allocation	
IRQ	Description
IRQ0	System Timer
IRQ1	Keyboard Controller
IRQ2	Cascade Interrupt
IRQ3	COM2
IRQ4	COM1
IRQ5	PCI Device
IRQ6	PCI Device
IRQ7	LPT1
IRQ8	RTC
IRQ9	ACPI Controller Interrupt
IRQ10	PCI Device
IRQ11	PCI Device
IRQ12	PS/2 Mouse
IRQ13	Numeric Data Processor
IRQ14	Primary IDE Controller
IRQ15	Secondary IDE Controller

ISA DMA Channel Allocation

DMA Channel	Description
Channel 0	Unassigned 8-bit channel
Channel 1	Unassigned 8-bit channel
Channel 2	Unassigned 8-bit channel
Channel 3	Unassigned 8-bit channel
Channel 4	Cascade channel
Channel 5	Unassigned 16-bit channel
Channel 6	Unassigned 16-bit channel
Channel 7	Unassigned 16-bit channel